AP

TRANSMITTAL FORM

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Application No.	09/496,990
Filing Date	February 2, 2000
First Named Inventor	Man Pak Yip
Art Unit	2155
Examiner Name	Kevin T. Bates
Total Number of Pages in This Submission	25
Attorney Docket Number	81862P173

ENCLOSURES ***(check all that apply)***

- [x] Fee Transmittal Form
  - [x] Fee Attached
- [ ] Amendment / Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
  - [ ] PTO/SB/08
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
  - [ ] Basic Filing Fee
  - [ ] Declaration/POA
  - [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s)
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [x] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [ ] Other Enclosure(s) *(please identify below):*

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Thinh V. Nguyen, Reg. No. 42,034 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Signature	
Date	July 16, 2007

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Typed or printed name	**Tu T. Nguyen**		
Signature		Date	**July 16, 2007**

FEE TRANSMITTAL for FY 2006

Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT	($)	500.00

Complete if Known	
Application Number	09/496,990
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METHOD OF PAYMENT *(check all that apply)*

☒ Check ☐ Credit card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 02-2666 Deposit Account Name: Blakely, Sokoloff, Taylor & Zafman LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below
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FEE CALCULATION

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1251	120	2251	60	Extension for reply within first month	
1252	450	2252	225	Extension for reply within second month	
1253	1,020	2253	510	Extension for reply within third month	
1254	1,590	2254	795	Extension for reply within fourth month	
1255	2,160	2255	1,080	Extension for reply within fifth month	
1401	500	2401	250	Notice of Appeal	
1402	500	2402	250	Filing a brief in support of an appeal	500.00
1403	1,000	2403	500	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1460	130	2460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
1809	790	1809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
				Other fee (specify) _____	
				SUBTOTAL (2)	($) 500.00

SUBMITTED BY Complete (if applicable)

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Signature				Date	07/16/07

Based on PTO/SB/17 (12-04) as modified by Blakely, Sokoloff, Taylor & Zafman (wlr) 12/15/2004.
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application. No.	:	09/496,990	Confirmation No. 6948
Applicant	:	Man Pak Yip	
Filed	:	February 2, 2000	
TC/A.U.	:	2155	
Examiner	:	Kevin T. Bates	
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APPEAL BRIEF

Dear Sir:

Applicant submits, the following Appeal Brief pursuant to 37 C.F.R. § 41.37 for consideration by the Board of Patent Appeals and Interferences. Please charge any additional fees or credit any overpayment to our deposit Account No.02-2666. A duplicate copy of the Fee Transmittal is enclosed for this purpose.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest is the assignee, Cisco Technology Incorporation.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to the appellants, the appellants' legal representative, or assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-60 of the present application are pending. Claims 1-60 remain rejected. The Applicant hereby appeals the rejection of claims 1-60.

IV. STATUS OF AMENDMENTS

On November 21, 2006, Applicant filed a response to an Office Action dated August 21, 2006. The Examiner issued a Final Office Action on January 18, 2007. On April 13, 2007, the Applicant filed a Notice of Appeal and a Pre-Appeal Brief Review Request in response to the Final Office Action. No amendments have been filed subsequent to the final rejection. On July 2, 2007, the Review panel issued the Notice of Panel Decision stating that the application remains under appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

1. Independent claims 1, 13, 25, 37, and 49:

A network 10 includes a wide area network (WAN) 11 and sub-networks 40 and 60. The WAN 11 includes ATM switches 12, 14, and 16. The sub-network 40 and 60 include ATM switches 50 and 70, respectively[1]. Each of the ATM switches 12, 14, 50, and 70 is configured to have a connection admission control (CAC) subsystem 18 which includes a hybrid CAC unit 15. The hybrid CAC unit 15 controls the connection admission using combined model-based and measurement-based estimators[2].

[1] See Specification, page 5, lines 16-23; page 6, line 3; page 6, line 10; Figure 1A.
[2] See Specification, page 6, lines 17-21; Figure 1A.

The hybrid CAC unit 15 includes a model-based estimator 210, a measurement-based estimator 220, and a controller 230. The model-based estimator 210 estimates an equivalent cell rate (ECR) based on the description of the connection request which includes the booking factor. The measurement-based estimator 220 estimates a measured utilization factor for the admitted connections in the network using measurements of data streams arriving at queues 240_1 to 240_K. The controller 230 receives the booking factor, the estimated ECR, and the measured utilization factor to generate the admission decision[3].

The controller 230 includes an addition request processor 510, a connection deletion command processor 520, and a resource updater 530. The addition request processor 510 receives the ECR from the model-based estimator 210 and the booking factor (BF) from the connection descriptor. The addition request processor 510 includes a request resource 512 and a resource allocation rule 514. The addition request processor 510 generates the admission decision based on the request resource 512 and the resource allocation rule 514[4].

The addition request processor 510 calculates the request resource 512 as a product of the ECR and the BF[5]. The resource updater 530 updates a resource reservation 540 of a subsystem using the ECR, the booking factor, and the measured utilization factor[6]. A request is accepted if it satisfies the resource allocation rule 514. The allocation of resources is based on a hierarchical resource organization[7]. The hierarchical resource organization includes a capacity (C), a service group (SG_i), a partition ($PART_{i,j}$), a CoS buffer ($CoSB_{i,k}$), a CoS_a , and a connection ($X_{a,m}$)[8].

2. Dependent claims 2-12, 14- 24, 26- 36, and 38-48, 50-60:

The description of the connection request further includes a connection descriptor and a quality of service (QoS) descriptor. The connection request includes information about the connection such as connection descriptors, QoS descriptor, and a booking factor. The connection descriptor includes at least one of a cell rate, a transport device speed, a queue depth, a cell loss ratio, and a link capacity. The transport device speed includes the port or trunk speed. The cell rate includes a peak cell rate (PCR), a sustained cell rate (SCR), a maximum burst size (MBS), and a minimum cell rate (MCR). The QoS

[3] See Specification, page 9, lines 18-25; Figure 2.
[4] See Specification, page 14, lines 7-12.
[5] See Specification, page 14, lines 13-14; equation (8).
[6] See Specification, page 15, lines 1-3.
[7] See Specification, page 15, lines 14-18.

descriptor includes a constant bit rate (CBR), a real-time variable bit rate (rt-VBR), a non-real-time variable bit rate (nrt-VBR), an unspecified bit rate (UBR), an available bit rate (ABR), and a guaranteed frame rate (GFR)[9].

The model-based estimator 210 includes a scale factor generator 310 and a scaler 320[10]. The scale factor generator 310 includes a look-up table 312 and a weighted averager 318. The look-up table 310 has entries computed for the QoS descriptor. The entries are indexed by the connection descriptor[11]. The look-up table 312 includes a CBR look-up table 314 and a VBR look-up table 316. The CBR look-up table 314 corresponds to the CBR QoS and the VBR look-up table 316 corresponds to the VBR[12]. The CBR look-up table 314 is indexed by a cell rate parameter P and the transport device speed C. The cell rate parameter P is within a range from unity to the maximum speed supported by the transport device. The scale factor generated by the CBR look-up table 314 is one of the entries indexed by the cell rate parameter P and the transport device speed C. The VBR look-up table 316 is indexed by a row index and a column index. The row index is a ratio between the queue depth and the MBS. The column index is a ratio between the link capacity and the PCR [13]. The scale factor is one of the entries indexed by the row and column indices. When there is no exact match for either the row index, or the column index, or both, the nearest entries to the row and column indices are interpolated to provide the scale factor. The interpolation is done by using the weighted averager 318[14].

The measurement-based estimator 220 includes a capacity estimator 410 and a measured utilization factor generator 420[15]. The measurement-based estimator 220 measures and monitors the statistics of the data streams arriving at the queues 240_1 to 240_K for every measurement window[16]. The capacity estimator 410 estimates a minimum resource needed for the admitted connections meeting QoS target requirements within the measurement window[17]. The measured utilization factor generator 410 generates the

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[8] See Specification, page 15, lines 17-20.
[9] See Specification, page 9, lines 2-11.
[10] See Specification, page 10, lines 1-2; Figure 3.
[11] See Specification, page 10, lines 7-10.
[12] See Specification, page 10, lines 8-11; lines 16-18; Figure 3.
[13] See Specification, page 10, lines 20-26.
[14] See Specification, page 10, line 27; page 11, lines 1-4.
[15] See Specification, page 12, lines 2-4; Figure 4A.
[16] See Specification, page 12, lines 4-7.
[17] See Specification, page 12, lines 8-13.

measured utilization factor using the estimated minimum resource from the capacity estimator 410 and measurement parameters of the connections in the system[18].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-60 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,490,249 issued to Aboul-Magd ("Aboul-Magd").

VII. ARGUMENTS

A. Claims 1-60 Are Not Anticipated by Aboul-Magd.

In the Final Office Action, the Examiner rejected claims 1-60 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,490,249 issued to Aboul-Magd ("Aboul-Magd"). Applicant respectfully traverses the rejection and submits that the Examiner has not met the burden of establishing a prima facie case of anticipation.

Aboul-Magd discloses an adaptive connection admission control scheme for packet networks. A hybrid connection admission control (CAC) function combines both the mathematical and the measurement aspects of the traffic (Aboul-Magd, col. 3, lines 37-40). The admission criterion is of the form w_1 x (μ + EBR_c < ubf x pool) AND w_2 x{ Σ EBR_c < obf x pool) (Aboul-Magd, col. 6, lines 19-25). The computation of the equivalent bit rate (EBR) depends on the traffic expected and the QoS parameter of interest (Aboul-Magd, col. 4, lines 58-60). The actual utilization is measured as the average load on the link per service class measured on a regular interval basis (Aboul-Magd, col. 5, lines 3-5). The rates assigned to the different bandwidth pools are based on the expected traffic pattern. The sum of the pool rates could be made equal to or, greater, or smaller than the link rate to allow for over-booking or under-booking (Aboul-Magd, col. 6, lines 12-16).

Aboul-Magd does not disclose, either expressly or inherently, (1) a first estimator to estimate an equivalent cell rate (ECR) based on description of the connection request, the description including a booking factor; (2) a second estimator to estimate a measured utilization factor for admitted connections in the network using measurements of data streams arriving at queues and the booking factor; (3) a controller to generate an admission

[18] See Specification, page 12, lines 21-23.

decision for the connection request comprising (a) an addition request processor to generate the admission decision based on a request resource equal to a product of the ECR and the booking factor, and a resource allocation rule using a hierarchical resource organization, and (b) a resource updater to update a resource reservation using the ECR, the booking factor, and the estimated measured utilization factor.

Aboul-Magd merely discloses two booking factors, an under-booking factor (ubf) and an over-booking factor (obf) (Aboul-Magd, col. 6, lines 31-41; lines 53-55). The ubf is used for the measured utilization and the obf is used for the mathematical-based CAC. In contrast, the claimed invention uses a booking factor for both the first and second estimators.

In addition, Aboul-Magd merely discloses the offering of the classes of services requires a hierarchy of CAC (Aboul-Magd, col. 9, lines 39-41). The discussion is related to virtual network CAC. The hierarchy of CAC includes a first level and a second level. At the first level, the CAC procedure is performed to decide on the acceptance of a new VN to the collection of the already existing VNs (Aboul-Magd, col. 9, lines 41-43). The second level of CAC is needed to control the amount of traffic admitted to the VN. None of these is related to a hierarchical resource organization. The hierarchical resource organization includes a capacity (C), a service group (SG_i), a partition ($PART_{i,j}$), a CoS buffer ($CoSB_{i,k}$), a CoS_a , and a connection ($X_{a,m}$). See, for example, Specification, page 15, lines 14-20.

The Examiner states that Aboul-Magd teaches a controller to generate an admission decision based on the estimated ECR and the estimated measured utilization factor, citing Aboul-Magd (col. 7, lines 30-58). Applicants respectfully disagree. The cited portions merely state that during those periods with low activity, the main factor in deciding the admission of the incoming request is the part of the admission criterion related to the mathematical CAC (Aboul-Magd, col. 7, lines 48-51), and during busy periods, an incoming request will only be granted if and only if both parts of the admission criterion are satisfied (Aboul-Magd, col. 7, lines 59-63).

Furthermore, Abou-Magd does not disclose, either implicitly or explicitly, an addition request processor to generate the admission decision based on a request resource using the ECR and the booking factor. Abou-Magd merely discloses setting the over- and under- booking factors to some pre-determined values. The over- and under- booking

factors are merely the upper and lower limits to account for the interruption of traffic and to limit the utilization to a provisioned pool capacity (Aboul-Magd, col. 6, lines 53-55, lines 31-33).

Moreover, Abou-Magd merely discloses setting the over-booking factor to 2 and the under-booking factors to 1 (Aboul-Magd, col. 7, lines 35-36). Since these are two fixed values, they cannot be used to compute the request resource which is a product of the ECR and the booking factor.

In addition, Abou-Magd does not disclose, either implicitly or explicitly, a resource updater to update a resource reservation using the ECR, the booking factor, and the estimated measured utilization factor. The admission decision is merely based on whether or not the mathematical CAC or both parts are satisfied, thus there is no updating of a resource reservation.

Regarding claims 6, 18, 30, 42, and 54, the Examiner contends that the CAC descriptors are considered map (look-up table) the admission request into one of the bandwidth pool that based handles the needs to the CAC descriptor (Final Office Action, page 4, lines 13-15). Applicant respectfully disagrees. Abou-Magd merely discloses that there are two cases: the first case is where all the service classes are mapped to the same pool and the second case is where each service class is mapped to a separate pool (Abou-Magd, col. 5, lines 52-57). Mapping the service classes into the same pool or separate pools does not mean that a look-up table is used. Mapping here simply means to partition the link rate into a number of bandwidth pools and to use rates based on the expected traffic pattern of the service class (Abou-Magd, col. 6, lines 12-13).

Regarding claims 7, 19, 31, 43, and 55, the Examiner contends that the second case of bandwidth pooling involves mapping the service classes into separate bandwidth pools and the classes are defined in column 2, lines 26-31 (Final Office Action, page 4, last paragraph). Applicant respectfully disagrees. As discussed above, mapping into bandwidth pools does not mean that separate look-up tables for CBR and VBR are used.

Regarding claims 8, 20, 32, 44, and 56, Abou-Magd merely discloses that for the CBR and premium services, the traffic parameter of interest to the EBR algorithm is the traffic peak rate (Abou-Magd, col. 2, lines 26-29). This does not mean that a CBR look-up table is indexed by a cell rate parameter and the transport device speed.

Regarding claims 9, 21, 33, 45, and 57, Abou-Magd merely discloses the service classes being mapped to different bandwidth pools (Abou-Magd, col. 5, lines 47-49). This does not mean that the scale factor is one of the entries indexed by the cell rate parameter and the transport device speed.

Regarding claims 10, 22, 34, 46, and 58, Abou-Magd merely discloses that for VBR services, the traffic parameters of interest are the peak rate, the average rate, and the burst size (Abou-Magd, col. 2, lines 29-31). None of this is related to a VBR look-up table, and the use of first and second ratios.

Regarding claims 11, 23, 35, 45, and 59, Abou-Magd merely discloses partitioning the link rate into a number of bandwidth pools (Abou-Magd, col. 6, lines 1-11). This is not related to the scale factor being a weighted value when there is no exact match with at least one of the first and second ratios.

Regarding claims 12, 24, 36, 48, and 60, Abou-Magd merely discloses using a low pass filter to smooth the per class average link utilization measurements (Abou-Magd, col. 5, lines 5-17), not a capacity estimator and/or a measured utilization factor generator.

To anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Vergegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989). Since the Examiner failed to show that Aboul-Magd teaches or discloses any one of the above elements, the rejection under 35 U.S.C. §102 is improper.

Therefore, Applicant believes that independent claims 1, 13, 25, 37, 49 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant requests that the Board enter a decision overturning the Examiner's rejection of all pending claims, and holding that the claims are neither anticipated nor rendered obvious by the cited prior art reference.

VIII. CONCLUSION

Applicant respectfully requests that the Board enter a decision overturning the Examiner's rejection of all pending claims, and holding that the claims satisfy the requirements of 35 U.S.C. §102.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: July 16, 2007

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IX. CLAIM APPENDIX

The claims of the present application which are involved in this appeal are as follows:

1. (previously presented) An apparatus to control connection admission for a connection request in a network, the apparatus comprising:

a first estimator to estimate an equivalent cell rate (ECR) based on description of the connection request, the description including a booking factor;

a second estimator to estimate a measured utilization factor for admitted connections in the network using measurements of data streams arriving at queues and the booking factor; and

a controller coupled to the first and second estimators to generate an admission decision for the connection request comprising:

an addition request processor to generate the admission decision based on a request resource equal to a product of the ECR and the booking factor, and

a resource allocation rule using a hierarchical resource organization, and

a resource updater to update a resource reservation using the ECR, the booking factor, and the estimated measured utilization factor.

2. (original) The apparatus of claim 1 wherein the description of the connection request further includes a connection descriptor and a quality of service (QoS) descriptor.

3. (original) The apparatus of claim 2 wherein the connection descriptor includes at least one of a cell rate, a transport device speed, a queue depth, a cell loss ratio, and a link capacity.

4. (previously presented) The apparatus of claim 3 wherein the cell rate is one of a peak cell rate (PCR), a sustained cell rate (SCR), a maximum burst size (MBS), and a minimum cell rate (MCR).

5. (original) The apparatus of claim 4 wherein the QoS descriptor is one of a constant bit rate (CBR), a real-time variable bit rate (rt-VBR), a non-real-time variable bit rate (nrt-VBR), an unspecified bit rate (UBR), an available bit rate (ABR), and a guaranteed frame rate (GFR).

6. (previously presented) The apparatus of claim 5 wherein the first estimator comprises:

a scale factor generator to provide a scale factor, the scale factor generator comprising a look-up table having entries computed for the QoS descriptor, the entries being indexed by the connection descriptor; and

a scaler coupled to the scale factor generator to scale the cell rate corresponding to the QoS using the scale factor, the scaled cell rate corresponding to the estimated ECR.

7. (original) The apparatus of claim 6 wherein the look-up table is one of a CBR look-up table and a VBR look-up table, the CBR look-up table corresponding to the CBR, the VBR look-up table corresponding to the VBR.

8. (original) The apparatus of claim 7 wherein the CBR look-up table is indexed by a cell rate parameter and the transport device speed, the cell rate parameter being within a range from unity to the PCR.

9. (original) The apparatus of claim 8 wherein the scale factor is one of the entries indexed by the cell rate parameter and the transport device speed.

10. (original) The apparatus of claim 7 wherein the VBR look-up table is indexed by a first ratio between the queue depth and the MBS and a second ratio between the link capacity and the PCR.

11. (original) The apparatus of claim 10 wherein the scale factor is a weighted value from entries nearest to an entry corresponding to the first and second ratios when there is no exact match with at least one of the first and second ratios.

12. (original) The apparatus of claim 1 wherein the second estimator comprises:

a capacity estimator to estimate a minimum resource needed for the admitted connections meeting quality of service (QoS) requirements within a measurement window; and

a measured utilization factor generator coupled to the capacity estimator to generate the measured utilization factor using the estimated minimum resource and measurement parameters.

13. (previously presented) A method to control connection admission for a connection request in a network, the method comprising:

estimating an equivalent cell rate (ECR) based on description of the connection request, the description including a booking factor;

estimating a measured utilization factor for admitted connections in the network using measurements of data streams arriving at queues and the booking factor; and

generating an admission decision for the connection request comprising:

generating the admission decision based on a request resource equal to a product of the ECR and the booking factor, and a resource allocation rule using a hierarchical resource organization, and

updating a resource reservation using the ECR, the booking factor, and the estimated measured utilization factor.

14. (original) The method of claim 13 wherein the description of the connection request further includes a connection descriptor and a quality of service (QoS) descriptor.

15. (original) The method of claim 14 wherein the connection descriptor includes at least one of a cell rate, a transport device speed, a queue depth, a cell loss ratio, and a link capacity.

16. (previously presented) The method of claim 15 wherein the cell rate is one of a peak cell rate (PCR), a sustained cell rate (SCR), a maximum burst size (MBS), and a minimum cell rate (MCR).

17. (original) The method of claim 16 wherein the QoS descriptor is one of a constant bit rate (CBR), a real-time variable bit rate (rt-VBR), a non-real-time variable bit rate (nrt-VBR), an unspecified bit rate (UBR), an available bit rate (ABR), and a guaranteed frame rate (GFR).

18. (original) The method of claim 17 wherein estimating the ECR comprises:

providing a scale factor using a look-up table, the look-up table having entries computed for the QoS descriptor, the entries being indexed by the connection descriptor; and

scaling the cell rate corresponding to the QoS using the scale factor, the scaled cell rate corresponding to the estimated ECR.

19. (original) The method of claim 18 wherein the look-up table is one of a CBR look-up table and a VBR look-up table, the CBR look-up table corresponding to the CBR, the VBR look-up table corresponding to the VBR.

20. (original) The method of claim 19 wherein the CBR look-up table is indexed by a cell rate parameter and the transport device speed, the cell rate parameter being within a range from unity to the PCR .

21. (original) The method of claim 20 wherein the scale factor is one of the entries indexed by the cell rate parameter and the transport device speed.

22. (original) The method of claim 19 wherein the VBR look-up table is indexed by a first ratio between the queue depth and the MBS and a second ratio between the link capacity and the PCR.

23. (original) The method of claim 22 wherein the scale factor is a weighted value from entries nearest to an entry corresponding to the first and second ratios when there is no exact match with at least one of the first and second ratios.

24. (original) The method of claim 13 wherein estimating the measured utilization factor comprises:

estimating a minimum resource needed for the admitted connections meeting quality of service (QoS) requirements within a measurement window by a capacity estimator; and

generating the measured utilization factor using the estimated minimum resource and measurement parameters by a measured utilization factor generator.

25. (previously presented) A computer program product comprising:

a computer usable medium having computer program code embodied therein for controlling connection admission for a connection request in a network, the computer program product having:

computer readable program code for estimating an equivalent cell rate (ECR) based on description of the connection request, the description including a booking factor;

computer readable program code for estimating a measured utilization factor for admitted connections in the network using measurements of data streams arriving at queues and the booking factor; and

computer readable program code for generating an admission decision for the connection request comprising:

computer readable program code for generating the admission decision based on a request resource equal to a product of the ECR and the booking factor, and a resource allocation rule using a hierarchical resource organization, and

computer readable program code for updating a resource reservation using the ECR, the booking factor, and the estimated measured utilization factor.

26. (original) The computer program product of claim 25 wherein the description of the connection request further includes a connection descriptor and a quality of service (QoS) descriptor.

27. (original) The computer program product of claim 26 wherein the connection descriptor includes at least one of a cell rate, a transport device speed, a queue depth, a cell loss ratio, and a link capacity.

28. (previously presented) The computer program product of claim 27 wherein the cell rate is one of a peak cell rate (PCR), a sustained cell rate (SCR), a maximum burst size (MBS), and a minimum cell rate (MCR).

29. (original) The computer program product of claim 28 wherein the QoS descriptor is one of a constant bit rate (CBR), a real-time variable bit rate (rt-VBR), a non-real-time variable bit rate (nrt-VBR), an unspecified bit rate (UBR), an available bit rate (ABR), and a guaranteed frame rate (GFR).

30. (original) The computer program product of claim 29 wherein the computer readable program code for estimating the ECR comprises:

computer readable program code for providing a scale factor using a look-up table, the look-up table having entries computed for the QoS descriptor, the entries being indexed by the connection descriptor; and

computer readable program code for scaling the cell rate corresponding to the QoS using the scale factor , the scaled cell rate corresponding to the estimated ECR.

31. (original) The computer program product of claim 30 wherein the look-up table is one of a CBR look-up table and a VBR look-up table, the CBR look-up table corresponding to the CBR, the VBR look-up table corresponding to the VBR.

32. (original) The computer program product of claim 31 wherein the CBR look-up table is indexed by a cell rate parameter and the transport device speed, the cell rate parameter being within a range from unity to the PCR.

33. (original) The computer program product of claim 32 wherein the scale factor is one of the entries indexed by the cell rate parameter and the transport device speed.

34. (original) The computer program product of claim 31 wherein the VBR look-up table is indexed by a first ratio between the queue depth and the MBS and a second ratio between the link capacity and the PCR.

35. (original) The computer program product of claim 34 wherein the scale factor is a weighted value from entries nearest to an entry corresponding to the first and second ratios when there is no exact match with at least one of the first and second ratios.

36. (original) The computer program product of claim 25 wherein the computer readable program code for estimating the measured utilization factor comprises:

computer readable program code for estimating a minimum resource needed for the admitted connections meeting quality of service (QoS) requirements within a measurement window by a capacity estimator; and

computer readable program code for generating the measured utilization factor using the estimated minimum resource and measurement parameters by a measured utilization factor generator.

37. (previously presented) A system interfacing to a network, the system comprising:

a plurality of queues to receive data streams; and

a circuit to control connection admission for a connection request in the network, the circuit comprising;

a first estimator to estimate an equivalent cell rate (ECR) based on description of the connection request, the description including a booking factor;

a second estimator to estimate a measured utilization factor for admitted connections in the network using measurements of the data streams arriving at the queues and the booking factor; and

a controller coupled to the first and second estimators to generate an admission decision for the connection request comprising:

an addition request processor to generate the admission decision based on a request resource equal to a product of the ECR and the booking factor, and a resource allocation rule using a hierarchical resource organization, and

a resource updater to update a resource reservation using the ECR, the booking factor, and the estimated measured utilization factor.

38. (original) The system of claim 37 wherein the description of the connection request further includes a connection descriptor and a quality of service (QoS) descriptor.

39. (original) The system of claim 38 wherein the connection descriptor includes at least one of a cell rate, a transport device speed, a queue depth, a cell loss ratio, and a link capacity.

40. (previously presented) The system of claim 39 wherein the cell rate is one of a peak cell rate (PCR), a sustained cell rate (SCR), a maximum burst size (MBS), and a minimum cell rate (MCR).

41. (original) The system of claim 40 wherein the QoS descriptor is one of a constant bit rate (CBR), a real-time variable bit rate (rt-VBR), a non-real-time variable bit rate (nrt-VBR), an unspecified bit rate (UBR), an available bit rate (ABR), and a guaranteed frame rate (GFR).

42. (original) The system of claim 41 wherein the first estimator comprises:

a scale factor generator to provide a scale factor, the scale factor generator comprising a look-up table having entries computed for the QoS descriptor, the entries being indexed by the connection descriptor; and

a scaler coupled to the scale factor generator to scale the cell rate corresponding to the QoS using the scale factor, the scaled cell rate corresponding to the estimated ECR.

43. (original) The system of claim 42 wherein the look-up table is one of a CBR look-up table and a VBR look-up table, the CBR look-up table corresponding to the CBR, the VBR look-up table corresponding to the VBR.

44. (original) The system of claim 43 wherein the CBR look-up table is indexed by a cell rate parameter and the transport device speed, the cell rate parameter being within a range from unity to the PCR .

45. (original) The system of claim 44 wherein the scale factor is one of the entries indexed by the cell rate parameter and the transport device speed.

46. (original) The system of claim 43 wherein the VBR look-up table is indexed by a first ratio between the queue depth and the MBS and a second ratio between the link capacity and the PCR.

47. (original) The system of claim 46 wherein the scale factor is a weighted value from entries nearest to an entry corresponding to the first and second ratios when there is no exact match with at least one of the first and second ratios.

48. (original) The system of claim 37 wherein the second estimator comprises:

a capacity estimator to estimate a minimum resource needed for the admitted connections meeting quality of service (QoS) requirements within a measurement window; and

a measured utilization factor generator coupled to the capacity estimator to generate the measured utilization factor using the estimated minimum resource and measurement parameters.

49. (previously presented) An apparatus for controlling connection admission for a connection request in a network, comprising:

means for estimating an equivalent cell rate (ECR) based on description of the connection request, the description including a booking factor;

means for estimating a measured utilization factor for admitted connections in the network using measurements of data streams arriving at queues and the booking factor; and

means for generating an admission decision for the connection request comprising:

means for generating the admission decision based on a request resource equal to a product of the ECR and the booking factor and a resource allocation rule using a hierarchical resource organization, and

means for updating a resource reservation using the ECR, the booking factor, and the estimated measured utilization factor.

50. (previously presented) The apparatus of claim 49 wherein the description of the connection request further includes a connection descriptor and a quality of service (QoS) descriptor.

51. (previously presented) The apparatus of claim 50 wherein the connection descriptor includes at least one of a cell rate, a transport device speed, a queue depth, a cell loss ratio, and a link capacity.

52. (previously presented) The apparatus of claim 51 wherein the cell rate is one of a peak cell rate (PCR), a sustained cell rate (SCR), a maximum burst size (MBS), and a minimum cell rate (MCR).

53. (previously presented) The apparatus of claim 52 wherein the QoS descriptor is one of a constant bit rate (CBR), a real-time variable bit rate (rt-VBR), a non-real-time variable bit rate (nrt-VBR), an unspecified bit rate (UBR), an available bit rate (ABR), and a guaranteed frame rate (GFR).

54. (previously presented) The apparatus of claim 53 wherein the means for estimating an ECR comprises:

means for providing a scale factor using a look-up table, the look-up table having entries computed for the QoS descriptor, the entries being indexed by the connection descriptor; and,

means for scaling the cell rate corresponding to the QoS using the scale factor, the scaled cell rate corresponding to the estimated ECR.

55. (previously presented) The apparatus of claim 54 wherein the look-up table is one of a CBR look-up table and a VBR look-up table, the CBR look-up table corresponding to the CBR, the VBR look-up table corresponding to the VBR.

56. (previously presented) The apparatus of claim 55 wherein the CBR look-up table is indexed by a cell rate parameter and the transport device speed, the cell rate parameter being within a range from unity to the PCR .

57. (previously presented) The apparatus of claim 56 wherein the scale factor is one of the entries indexed by the cell rate parameter and the transport device speed.

58. (previously presented) The apparatus of claim 55 wherein the VBR look-up table is indexed by a first ratio between the queue depth and the MBS and a second ratio between the link capacity and the PCR.

59. (previously presented) The apparatus of claim 58 wherein the scale factor is a weighted value from entries nearest to an entry corresponding to the first and second ratios when there is no exact match with at least one of the first and second ratios.

60. (previously presented) The apparatus of claim 49 wherein the means for estimating a measured utilization factor comprises:

means for estimating a minimum resource needed for the admitted connections meeting quality of service (QoS) requirements within a measurement window by a capacity estimator; and

means for generating the measured utilization factor using the estimated minimum resource and measurement parameters by a measured utilization factor generator.

XI. EVIDENCE APPENDIX

None

XII. RELATED PROCEEDINGS APPENDIX

None